

[Name of the Document] Claims

[Claim 1]

A shell type needle roller bearing wherein a plurality of needle rollers are arranged along the inner-diameter surface of a shell type outer ring formed by pressing, characterized in that the surface roughness of the inner-diameter surface of said outer ring is finer than the surface roughness of its outer-diameter surface.

[Claim 2]

A shell type needle roller bearing as claimed in claim 1 wherein the circumferential surface roughness of the inner-diameter surface of said outer ring is Ra 0.05-0.3  $\mu\text{m}$ .

[Claim 3]

A shell type needle roller bearing as claimed in claim 2 wherein the axial surface roughness of the inner-diameter surface of said outer ring is Ra 0.3 $\mu\text{m}$  or less.

[Claim 4]

A shell type needle roller bearing wherein a plurality of needle rollers are arranged along the inner-diameter surface of a shell type outer ring formed by pressing, characterized in that the inner-diameter roundness of said outer ring is not more than 10  $\mu\text{m}$ .

[Claim 5]

A shell type needle roller bearing wherein a plurality of needle rollers are arranged along the inner-diameter surface of a shell type outer ring formed by pressing, characterized in that the amount of uneven thickness of the tubular portion of said outer ring is less than 10  $\mu\text{m}$ .

[Claim 6]

A shell type needle roller bearing as claimed in any of claims 1-5 wherein means for making the surface roughness of the inner-diameter

surface of said outer ring finer than the surface roughness of its outer-diameter surface, means for making the inner-diameter roundness of said outer ring less than 10  $\mu\text{m}$ , or means for making the amount of uneven thickness of the tubular portion of said outer ring less than 10  $\mu\text{m}$  is one in which an ironing step is provided in the pressing for forming said shell type outer ring, and the lubricating conditions on the outer-diameter side ironing surface which is the outer-diameter surface of said outer ring in the ironing step are a substantially fluid lubricating state.

[Claim 7]

A shell type needle roller bearing as claimed in claim 6 wherein the number of drawings in a drawing step in said pressing is not more than three times, and said drawing step is a drawing/ironing step carried out simultaneously with said drawing step, which is final.

[Claim 8]

A shell type needle roller bearing as claimed in claim 7 wherein the number of drawings in said drawing step is one, and said ironing step is a drawing/ironing step carried out simultaneously with this one-time drawing step.

[Claim 9]

A shell type needle roller bearing as claimed in any of claims 6-9 wherein the material of said shell type outer ring is a phosphate film-treated steel plate.

[Claim 10]

A support structure for a spindle of a compressor in which a compression action member of the compressor is actuated by rotary-driving the spindle, and radial loads on the spindle are supported by a needle roller bearing arranged in the compressor, characterized in that said needle roller bearing is a shell type needle roller bearing as claimed in any of claims 2-9.

[Claims 11]

A support structure for a piston pump driving portion wherein the driving portion of the piston pump is abutment-supported by a needle roller bearing fitted on an eccentric portion of a motor output shaft, characterized in that said needle roller bearing is a shell type needle roller bearing as claimed in any of claims 2-9.